IBD Troubleshooting Guide

Problems at Ignition Steps:

System will not get past the "1_Ignite" step, or aborts with Alarm: "ignition attempts exceeded", or "Filament Current Too High"

Possible cause: Neutralizer RFN power supply crashed

You can tell if a Neutralizer supply has crashed if an RFN power supply (by "Plasma Process Group") displays the values from the previous run and does not fluctuate from those values. During an ignition, the display usually shows single digit values and fluctuates while trying to ignite.

You can tell if the Depo RFN supply has "crashed" is the display values stay frozen even when the system starts trying to ignite the RFN . Or if it displays a non-zero emission current even though the plasmas are off.

(if the system's trying to ignite RFNs the "PBN" indicator will be lit green under *Process Module > View Depo/Assist* screen. The indicator will have a black background if the RFN is expected to be off. A normal process will light the Depo RFN before the Assist RFN.)

Fix: Restart RFN Supplies & re-run process

1. Make sure system is not trying to run:
    - You can tell by observing the Run button in the *Process Module > Process Control* screen - Green indicator and "Running" will be displayed if it is running.
    - If system is NOT running (ie. "Idle" or "Aborted" are displayed), do NOT press the Run button.
    - If the system is running, Abort run via *Process Module > Process Control* screen, by pressing "Run" repeatedly **(usually 3 times - SLOWLY, leave 5 sec between presses)** until the button's indicator is black (off). Pressing too fast can crash the PM software.
2. Turn off both RFN power supplies.
    - These are the blue "Plasma Process Group" device in the Depo & Assist racks with number displays.
3. Turn off both RFN Interfaces.
    - These just have a power switch, also by Plasma Process Group & blue color.
4. Wait 5 sec and turn on the Interfaces (w/only power switch) & then the Supplies (w/display).
5. Once RFN Power Supply has finished booting, re-run process (via *Process Module > Process Control > Load & Send* (if sample is already in chamber). When the process completes, will have to remove sample with *Process Control > Auto Unload*)

Arcing/Beam Stability Problems

System aborts with "Beam Recovery Failed", and/or "ARC Detected" in the log files, or many "Beam Recoveries" occur during a run (can be seen in log files).

If this occurs only during the deposition step, at/near the beginning of the dep step:
Possible Cause: Grids not Clean

Fix: Run a grid clean
• Run 1_GridClean with the GridClean step set to 5-10 min (your sample will not be affected).

Computer Connection Problems

CTCu (User computer) does not update the Process Module's status (may look like process "froze"). May report "Attempt to connect failed/timed out", and lower bar may be yellow (instead of grey).

Possible Cause: Network Connection (to PM computer) Lost.
Processes already running in PM should not be affected and will run normally until completion, but User Comp will not update to show the process status. Robots may not respond.

Fix: Tell CTCu software to reconnect to PM1 module*

1. In the bottom left, to the left of the "Alarm" & "Event" buttons, click the circle next to "PM1" if it is black (not connected)

2. Once you re-connect, the "Recipe", "Main Step", "Sub Step", "Elapsed" and "Remaining" times will update normally.
3. You must use "AutoUnload" to remove your sample.

NOTE: You can see whether the process completed successfully by observing what step the process is on. If the system is not running (no green indicators on the "PBN", "Beam" and "Gas" indicators) and the "Main Step" = "1_ShutDown" and the "SubStep"="ShutDown_Open_Cryo" then the process completed normally.
NOTE: If the process did not complete normally, you will see the Step and Elapsed/Remaining times in the Process area.

***This fix also works for "Network Error, lost connection, aborted due to time-out and other failure".

Additional Problems and Notes

Issue: “Process Wafer” button is disabled/greyed-out.

Fix:

- If wafer shows “Error” (red) or “Completed” (green) - double-click wafer icon (square), set status to “Unprocessed”, and close.
- If the “ Motion Initialized” indicator is not green - Click Main Menu → Process Module → Fixture → Initialize Motion (This will home the robot and get it ready for load/unload).

To run recovery process when the wafer is still in the chamber:

1. Main Menu → Process Module → Process Control
2. Select “Load” to load modified process (for remaining dep time).
3. Select “Send” to run the modified process.

To remove sample after recovery process or aborted process:

1. Main Menu → Process Control → Auto Unload
   NOTE: Make sure the isolation door between the loadlock and the chamber is closed before venting the loadlock!!

Robot Movement Order for Manual Load/Unload

Verify the " Motion Initialized" indicator is green before performing a manual transfer. If it is not: Click Main Menu → Process Module → Fixture → Initialize Motion (This will home the robot and get it ready for load/unload).

- **Loading an unprocessed sample:**

  System State= In LL, Down, Pressure Matched, Ready to Load

  1. Open Isolation Door
  2. Up
  3. In PM
  4. Down
  5. In LL
  6. Close Isolation Door

- **Unloading after a completed run:**

  System State= In LL, Down, Pressure Matched, Ready to Load

  1. Open Isolation Door
  2. Down (should already be here, but if set to Up)
  3. In PM
  4. Up
  5. In LL
  6. Down
  7. Close Isolation Door

NOTE: If the robot stops in the middle of a load/unload, simply complete the transfer yourself using the above directions, starting with the step the transfer stopped on.

Normal non-aborting “Events” or “Alarms”:

- Event: “CLimiter::(Depo/Etch FeedbackControlLoop PBNFilament) - At High/Low Limit”
  There is no filament - filament-based Plasma-Bridge Neutralizers (PBN) were replaced with RF-based RF-Neutralizer (RFN). However the Veeco software does not know this, so it still tries to ramp the PBN filament current, generating warnings and errors.

- Event/Alarm: “Filament Requires Maintenance”
  (same reason as above)

- Event/Alarm: “Warning: Depo/Etch PBN Filament Requires Maintenance”
  (same reason as above)

- A source’s RF “Program” and “Readback” values are different.
  System only begins a step at the “Program” (recipe) value for “RF Ignition Power”, and the modifies the RF power until the Beam Current (Beam_I, number of ionized particles hitting grid) reaches it’s programmed value. Thus the film is independent of actual RF power used, as long as the Beam_I is correct.

- Event/Alarm: “System Busy”
  This is normal.